Identifying and Mapping Department Opportunities to ITS User Services

ITS User Services	Department Functions and Activities	Where are we now / current situation	Opportunities		
			3 – 5 years	5 – 10 years	10+ years
Traveller Information Services - Provide travellers with pre-trip and en-route information for route planning and optimization	• Advise en-route travellers of current road and weather conditions	• Use of 3 Changeable Message Signs (CMS) • Highway Advisory Radio (HAR) at 1 site with the potential for 2 others	• Expanded HAR and CMS systems • Portable HAR/CMS systems for use in conjunction with maintenance activities and construction zones	• Installation of bridge ice and fog warning systems at some bridge sites	• Fully integrated Road Weather Information System (RWIS) with HAR/CMS • Digital broadcasting RWIS • Installation of bridge ice and fog warning systems at all bridge sites • Animal detection and warning systems at some sites
	• Provide current road and weather conditions for pre-trip planning	• Alberta Motor Association (AMA) road reports via telephone and on the internet • City of Calgary has one Road Weather Information System (RWIS) subsystem on Deerfoot Trail	• Expanded Highway Advisory Radio (HAR) • Development of RWIS	• Current construction and maintenance schedule on the internet and at kiosks (rest areas, shopping malls, etc) • Current road and weather conditions on the internet, with links to other sites (Environment Canada, AMA) • Tourist specific information available at selected sites	• Continued use of road conditions on the internet and at kiosks with the inclusion of real-time Closed Circuit Television (CCTV) images • Continued placement of construction and maintenance activities on the internet and at kiosks
Traffic Management Services - Monitor and adjust vehicle flow for optimization and improved safety	• Traffic management in construction and maintenance zones	• Potential testing of Highway Advisory Radio (HAR) on specific maintenance or construction projects during Summer 2000	• Portable HAR/ Changeable Message Signs (CMS) systems for use in conjunction with maintenance activities and construction zones • Speed management via video detection and CMS		• Automatic vehicle speed control in speed restricted zones
	• Manage traffic signals controlled by department	• Conventional traffic signal management	• Potential upgrade of existing signals with remote capabilities and network co-ordination		• All traffic signal controllers fully on line with emergency pre-emption and integrated vehicle counts

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Traffic Management Services (cont.)	• Manage traffic on major urban and rural routes	• Will be assuming responsibility of Road Weather Information System (RWIS) subsystem on Deerfoot Trail in Calgary (includes Changeable Message Signs (CMS) and ice detection system) • Will be reviewing ITS applications and potential for deployment on Anthony Henday Drive in Edmonton and Deerfoot Trail in Calgary • Emergency call boxes (2-way communications) deployed along Highways 1 (Calgary to Banff), 2 (Calgary to Edmonton), 2A (Blackfalds) and along Deerfoot Trail – program under review and may be abandoned	• Make provisions for future ITS applications in the design of major urban routes • Introduce an incident management system which will include adding Closed Circuit Television (CCTV) cameras along Deerfoot Trail		• Freeway and incident management systems with CCTV on major routes with automatic red-light adjustment (possibility of red light cameras) with real-time traffic signal control adjustments • Real-time warning at rail crossings • In-vehicle real-time warning at rural highway intersections • Implement an operations control centre to manage various ITS programs • Investigate/ implement ramp metering as part of freeway management tools for Deerfoot Trail • Investigate/ implement High Occupancy Vehicle (HOV) lane development for Deerfoot Trail
Commercial Vehicle Operations - Monitor truck compliance and movements for improved safety and efficiency	• Track overweight/ over-dimension vehicles and log hauls	• No means of tracking truck movements • Log haul vehicles follow predefined routes based on weight • Transportation Routing and Vehicle Information System (TRAVIS) under development	• TRAVIS, including route selection, fully operational		• Global Positioning System (GPS) tracking truck movements. Possibility of truck permits being paid on a per kilometre basis • GPS tracking of log hauls with links to the weigh scales at the mill
	• Facilitate commercial vehicle US border crossing	• Joint border crossing facility	• Facilitated border crossings (pre-clearance, Vehicle Inspection Station (VIS), Weigh-in-Motion (WIM), automatic data exchange)		
	• Administer commercial vehicle permits and licenses	• International Rate Program (IRP), and Canadian Agreement on Vehicle Registration (CAVR)			• Automated inter-provincial and international permitting

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Commercial Vehicle Operations (cont.)	• Enforce weight and dimension regulations, and hours of service	• One semi-operational Automatic Vehicle Identification/ Weigh-in-Motion (AVI/WIM) site at the Leduc Inspection Station • A WIM site is being planned for Deerfoot Trail in Calgary	• Make provisions for future ITS applications in the planning and design of facilities	• Fully operational AVI and WIM along our North-South Trade Corridor (NSTC). System could be integrated with a database for traffic forecasting for easy Equivalent Single Axle Load (ESAL) determination	• Fully integrated AVI/WIM system along major provincial highways • On-board hours of service, fleet and driver management with Geographic Information System (GIS)
	• Process vehicle clearance at inspection stations	• Weigh-in-Motion (WIM), International Rate Program (IRP), prorate. Vehicles stop at scale for weighing and document check (including dangerous goods)		• WIM and transponders to identify vehicle and dangerous goods, including a link to registries or IRP (prorate) to validate registration	
	• Determine road bans	• Road bans determined manually			• Automatic monitoring of thaw/frost in roadbeds (with posting on internet)
Information Warehousing - Collect transportation data for improved efficiency and integrated decision making	• Administer driver records and licensing	• Traffic violation data received via electronic interface with Alberta Justice. Data entry problems and court interface can be delayed up to 3 days after the conviction • Basic suspension information available to officers through terminals in vehicles or via radio communication • Officers fax information (predisposition, vehicle seizures, hearings, etc.) to department for manual entry	• Electronic data input (information still passed through an interface with Alberta Justice) • Basic information available to all officers from laptops in the vehicle • Some electronic completion and transmittal directly to Alberta Infrastructure	• Full suspension information available to the officer on in-vehicle computers	• Fully on-line integrated and automated among police agencies, Alberta Justice, Government Services and Alberta Infrastructure, that updates suspension and conviction information automatically • All forms completed and transmitted electronically in real-time
	• Collect collision data	• Data hand recorded and passed into either a city or provincial data entry unit - significant room for error	• Information inputted electronically into Motor Vehicle System (MOVES) database at event. Global Positioning System/ Geographic Information System (GPS/GIS) collision locations and special location monitoring		• Fully integrated electronic system (including vehicle seizure information, suspensions, fines, etc.) • Collision records available graphically • Use vehicle "black box" data recorder for collision analyses

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Information Warehousing (cont.)	• Collect traffic data	• Collect speed and Weigh-In-Motion (WIM) data • Automated loop and manual traffic counts • Using 15 year old Dangerous Goods origin/destination (O/D) data	• Automatic vehicle classifier that goes beyond the standard classification when doing traffic counts • Combine traffic behavioural data with roadway parameters to develop, fine-tune and verify new ITS driven simulation modeling	• Investigate/ implement new traffic data collection technologies	• Expanded use of intelligent traffic counting • Closed Circuit Television (CCTV) monitoring for O/D surveys on major corridors and traffic studies at major intersections[2] • Potential for dangerous goods O/D surveys • Use "smart" vehicle probes and roadside links to obtain real-time traffic and other conditions • Use ITS-developed micro/macro simulation models for testing new ITS standards and implementations
	• Collect road and related inventory data	• Global Positioning System (GPS) videolog van – collects GPS tagged video images of highway and roadside objects • Purchasing GPS backpack to gather culvert and guardrail inventory	• Continue to investigate digital videolog technologies	• Integrate videolog data with the department's Geographic Information System (GIS)	• Fully integrated GIS-based road inventory and appurtenance management
	• Construction and maintenance monitoring	• Winter 99/00 trial of maintenance tracking using Global Positioning System (GPS) • Pilot project was done on construction material quantity monitoring	• Possible use of GPS for snow plow tracking and invoicing	• Construction material quantity measuring via GPS/ transponder technology • Maintenance work performance-based monitoring system	
	• Collect geotechnical data	• Manual data collection process with twice yearly site visits			• Automated remote instrumentation (data loggers, video cameras) to monitor potentially unstable geotechnical sites

[2] Traffic data collection via department systems or in conjunction with in-vehicle systems, and subsequent modeling or microsimulation, may affect the real-time decisions of the department's ITS.

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Emergency Management Services - Identification, notification and guidance for improved response times and increased safety	• Assist with emergency response to Dangerous Goods (DG) incidents • Review of local authorities' DG route designations	• Manual DG document check • Using 15 year old DG origin/ destination (O/D) data		• Automatic DG identification via transponder • Provision of Global Positioning System mapping for easier emergency response to incidents	• Potential for DG O/D surveys using intelligent traffic data collection • Incident detection on major routes with advisories via Changeable Message Signs, Highway Advisory Radio, etc. • Install infrastructure to handle automatic vehicle emergency response Mayday systems
Electronic Payment	• Applications with potential are electronic toll collection and smart card payment systems. These applications would be private sector or industry driven but may impact Alberta Infrastructure				
Public Transport Services	• These applications (e.g. Global Positioning System tracking of transit and bus units, multi-modal and accessible computerized reservations systems, automatic taxi dispatch) will be municipality and industry driven but may impact Alberta Infrastructure with respect to funding, leadership and integration with our Traveller Information Services				
Vehicle Safety and Control Systems	• Certain department applications will require co-ordination with industry – for example, the implementation of in-vehicle real-time warning at rural highway intersections or automatic vehicle speed controls will require integration with vehicle technology • Certain applications will be industry driven but may impact the department with respect to infrastructure issues (e.g. installation of private transmitters along right of way, magnetized stripping on highways for vehicle-to-vehicle and vehicle-to-highway communication)				

LIST OF ABBREVIATIONS

AMA	Alberta Motor Association
AVI	Automatic Vehicle Identification
C-TEP	Centre for Transportation Engineering and Planning
CANAMEX	CANada, AMerica, MEXico 1,700 mile highway corridor
CAVR	Canadian Agreement on Vehicle Registration
CCTV	Closed Circuit Television
CMS	Changeable Message Sign
CVO	Commercial Vehicle Operations
DG	Dangerous Goods
ESAL	Equivalent Single Axle Load
GIS	Geographic Information System
GPS	Global Positioning System
HAR	Highway Advisory Radio
HOV	High Occupancy Vehicle
IRP	International Registration Plan
MOVES	Motor Vehicle System
NSTC	North-South Trade Corridor
O/D	Origin/Destination
ROW	Right of Way
RWIS	Road Weather Information System
TRAVIS	Transportation Routing and Vehicle Information System
VIS	Vehicle Inspection Station
WIM	Weigh-in-Motion